

Prouts Neck Quadrangle, Maine

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Funding for the preparation of this map was provided in part by the U.S. Geological Survey
Cooperative Geological Mapping (COGEOMAP) Program, Cooperative Agreement No. 14-08-0001-A0381.



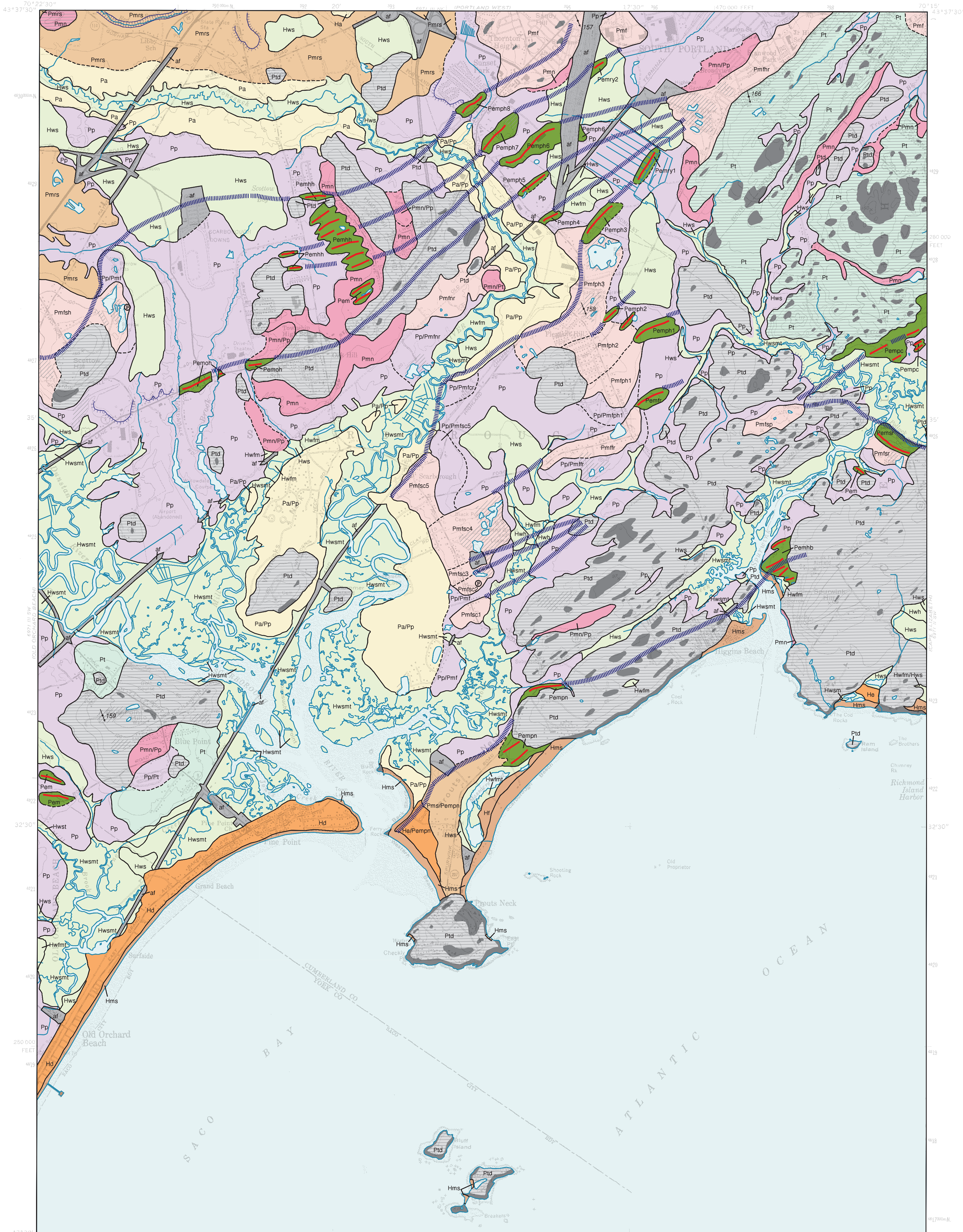
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Open-File No. 99-97
1999

For additional information,
see Open-File Report 99-128.

Surficial Geology



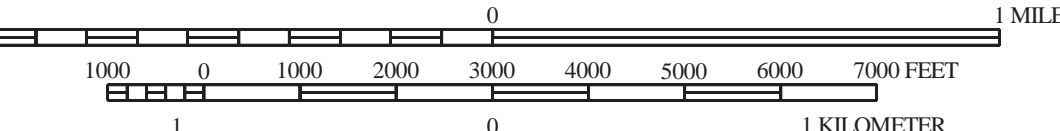
SOURCES OF INFORMATION

Surficial geologic mapping by J. Michael Clinch and Woodrow B. Thompson completed during the 1987 field season, funding for this work provided by the U.S. Geological Survey COGEOMAP program. Wetlands data provided in part by Cornelia C. Cameron, U.S. Geological Survey, 1988. Geologic unit designations and contacts revised and matched to adjacent quadrangles in 1999 by MGS geologists.



Quadrangle Location

SCALE 1 : 24,000



CONTOUR INTERVAL 20 FEET



Topographic base from U.S. Geological Survey Prouts Neck quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not implicate responsibility for any present or potential effects on the natural resources.

- af** **Artificial fill** - Includes landfills, highway and railroad embankments, and dredge spoil areas. These units are mapped only where they are resolvable using the contour lines on the map, or where they define the limits of wetland units. Minor artificial fill is present in virtually all developed areas of the quadrangle.
- Ha** **Stream alluvium** - Fine sand and silt with some gravel. Comprises flood plains along present streams and rivers. Extent of alluvium approximates areas of potential flooding.
- Hd** **Dune deposits** - Sand dunes adjacent to modern beaches.
- Hms** **Marine shoreline deposits** - Sand to gravel beaches.
- Hr** **Marine spillover fans** - Formed during major storm events, located inland from Scarborough Beach.
- He** **Eolian deposits** - Sand dunes located inland from modern beaches.
- Hwsm** **Salt marshes*** - Located along the Scarborough River and its tributaries, and along the Spurwink River. Thin, non-commercial peat layers are present atop a mineral substrate consisting of estuarine sands and muds.
- Hws** **Swamp*** - With no peat present, distinguished from other wetlands by the presence of trees.
- Hwh** **Heath** - With no peat present, distinguished from other wetlands by the absence of trees and the presence of shrubs.
- Hwfm** **Freshwater marsh*** - With no peat present, distinguished from other wetlands by the presence of only grasses and sedges.
- Pa** **Alluvium** - Coarse to fine alluvial sand in high terraces and overlying Presumpscot Formation silty clays, north and south of the Nonesuch River. (Pa/Pp) used when the sand thickness is less than 10 feet.
- Pms** **Marine shoreline** - Beach and dune sands overlying the Prouts Neck end moraine (Pms/Pemph) Prouts Neck quadrangle. Beach morphology is poorly preserved, but sands are present along the ridge crest.
- Pmn** **Nearshore deposits** - A wave reworked blanket of sand, fine gravel, or silty sand present along hillslopes and at the foot of these slopes. This unit is mapped only where it completely obscures the underlying materials and morphology.

- Pmrs** **Marine regressive sand deposits** - Massive to stratified and cross-stratified, well sorted sand. May have gradational basal contact with Pp. Deposited during regressive phase of marine submergence.
- Pp** **Presumpscot Formation** - Massive to laminated silty clays with rare dropstones and occasional shelly horizons, which overlies bedrock and till exposures, and is interbedded with and overlies end moraines and marine fan deposits.
- Pem** **End moraines** - Linear ridges consisting of bedded sand and gravel interbedded with Presumpscot Formation silty clays and overlain by till on the ice proximal face of the moraine. Uncorrelated end moraines are labeled Pem, while those that can be used to reconstruct major ice marginal positions are also given a local geographic name, listed below:

Pempr - Prouts Neck end moraine
Pembh - Higgins Beach end moraine cluster
Pemp - Spurwink River end moraine
Pempc - Pond Cove end moraine cluster
Pempfr - Fogg Road end moraine
Pempfh - Pleasant Hill end moraines 1 to 8
Pempy - Oak Hill end moraine
Pemo - Oak Hill end moraine
Pemhh - Hunnewell Hill end moraine cluster

- Pmf** **Submarine fans** - Thick sand and gravel accumulations formed at the mouth of subglacial tunnels at Pleistocene ice margins. The sand and gravel is interbedded with and overlain by Presumpscot Formation clays at the distal edges of the fans, and interlayered with and overlain by tills at their ice-contact faces. Each fan, or group of fans has been assigned a unique geographical name, listed below:

Pmfsc - Scarborough Center marine fan 1 to 5
Pmfsp - Sanford pit marine fan
Pmfpr - Spurwink River marine fan
Pmfrr - Fogg Road marine fan
Pmfph - Pleasant Hill marine fans 1 to 3
Pmfcr - Chamberlain Road marine fan
Pmfhr - Highland Road marine fan
Pmftr - Nonesuch River marine fan
Pmfsh - Scottow Hill marine fans

The correlations of these marine fan deposits and the end moraines are shown in Clinch and Thompson (1990).

- Pt** **Till** - Gravely to bouldery, sandy matrixed diamict.
- Ptd** **Thin drift areas** - Areas with less than ten feet of drift covering bedrock. Till overlies bedrock on hillslopes and ridge crests; Presumpscot Formation silty clays are present in depressions; and nearshore deposits may overlie till, Presumpscot Formation, and bedrock on hillslopes and at the base of these slopes.
- Bedrock outcrops/thin drift areas** - Gray areas are individual bedrock outcrops, with little or no surficial sediment cover. Ruled pattern indicates areas of abundant bedrock outcrop and/or areas where the mapped surficial sediments are generally less than 10 ft (3 m) thick.
- Contact** - boundary between map units. Dashed where very approximate.
- Striations** - observations made at dot.
- End moraine crests**
- Terrace scarps**
- Mapped and inferred ice marginal positions**
- Areas where original topography is disturbed by excavation (chiefly gravel pits)**
- Marine fossil locality**

*NOTE: Wetland symbols followed by "i" indicate areas where peat deposits probably do not constitute a significant commercial resource, either because they are thin (< 1.5 m), or they have an ash content greater than 25 percent. Symbols followed by "p" indicate peat deposits that are thicker (generally > 1.5 m), with ash content less than 25 percent, and thus may be suitable for commercial applications.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

- Clinch, J. M., and Thompson, W. B., 1999, Surficial geology of the Prouts Neck 7.5-minute quadrangle, Cumberland and York Counties, Maine: Maine Geological Survey, Open-File Report 99-128, 33 p.
- Clinch, J. M., and Thompson, W. B., 1999, Surficial materials of the Prouts Neck quadrangle, Maine: Maine Geological Survey, Open-File Map 99-41.
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- Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
- Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.